PIONEER®
The Art of Entertainment

Service Manual

ORDER NO.
ARP2313

SOUND IMAGE CONTROLLER

GR-P510

ZEB2, ZEWZIW2

- **Refer to the service manuals ARP2172, GR-P510/ZEBUC and ARP2187, GR-P510/ZEWZIW.**

- **This manual is applicable to the GR-P510/ZEB2 and ZEWZIW2 types.**
- **GR-P510/ZEB2 is the same model as GR-P510/ZEWZIW with a different PACKING. Please refer to the service manual for GR-P510/ZEBUC (ARP2172) and GR-P510/ZEWZIW (ARP2187), for other items than the PACKING.**

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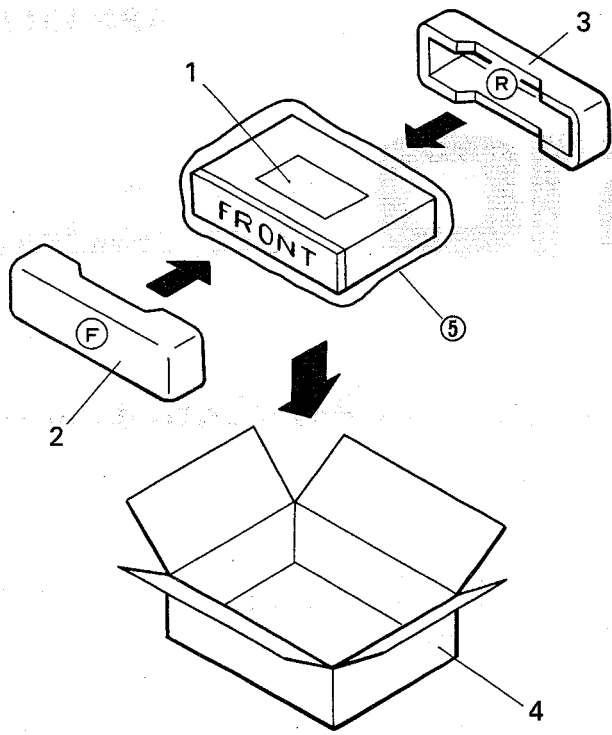
FV JULY 1991 Printed in Japan

PACKING

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*



PARTS LIST

Mark	No.	Description	Parts No.
	1.	Sub operating instructions	ARH1047
	2.	Front pad	AHA1323
	3.	Rear pad	AHA1324
	4.	Packing case	AHD2159
	5.	Packing sheet	AHG1175

NOTE: GR-P510/ZEB2 and GR-P510/ZEWZIW2 are not different in packing drawing and packing parts list.

NOTE: The operating instructions is contained in the A-P710 and A-P510 packing.
Please refer to the service manuals of A-P710/HE2, HB2 and HEWZIWZ as well as A-P510/HE2, HB2 and HEZIWZ (ARP2310).

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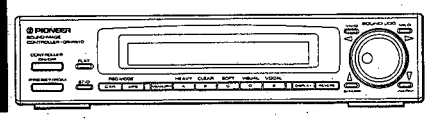

ORDER NO.
ARP2172

SOUND IMAGE CONTROLLER

GR-P510

GR-P510 HAS THE FOLLOWING :

Type	Power Requirement	Remarks
ZEBUC	(DC power supply)	
ZEWZIW	(DC power supply)	

- **This manual is applicable to ZEBUC type.**
- **As to the other types, refer to applicable service manual.**
- **This product is a component of systems. As to the system composition, refer to the system manuals.**
- **This product does not function properly when independent ; to avoid malfunctions, be sure to connect it to the prescribed system component(s), otherwise damage may result.**

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FX FEB. 1991 Printed in Japan

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).
When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

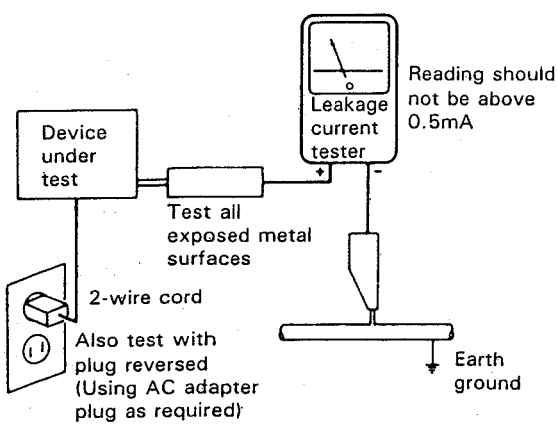
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Reading should not be above 0.5mA
Leakage current tester
Device under test
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

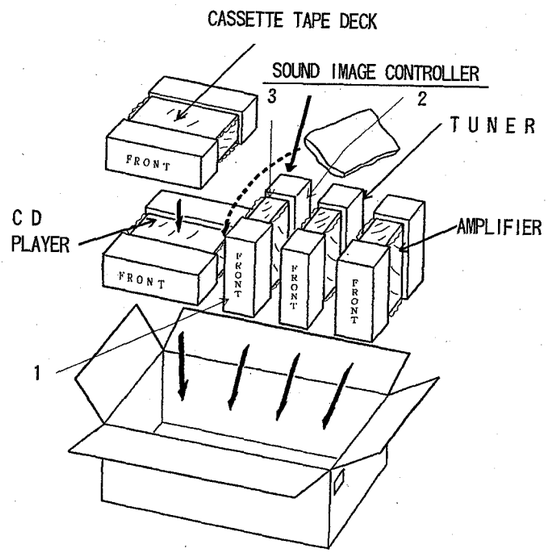
Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. PACKING

Mark	No.	Description	Part No.
	1	FRONT PAD	AHA1323
	2	REAR PAD	AHA1324
	3	PACKING SHEET	AHG1175

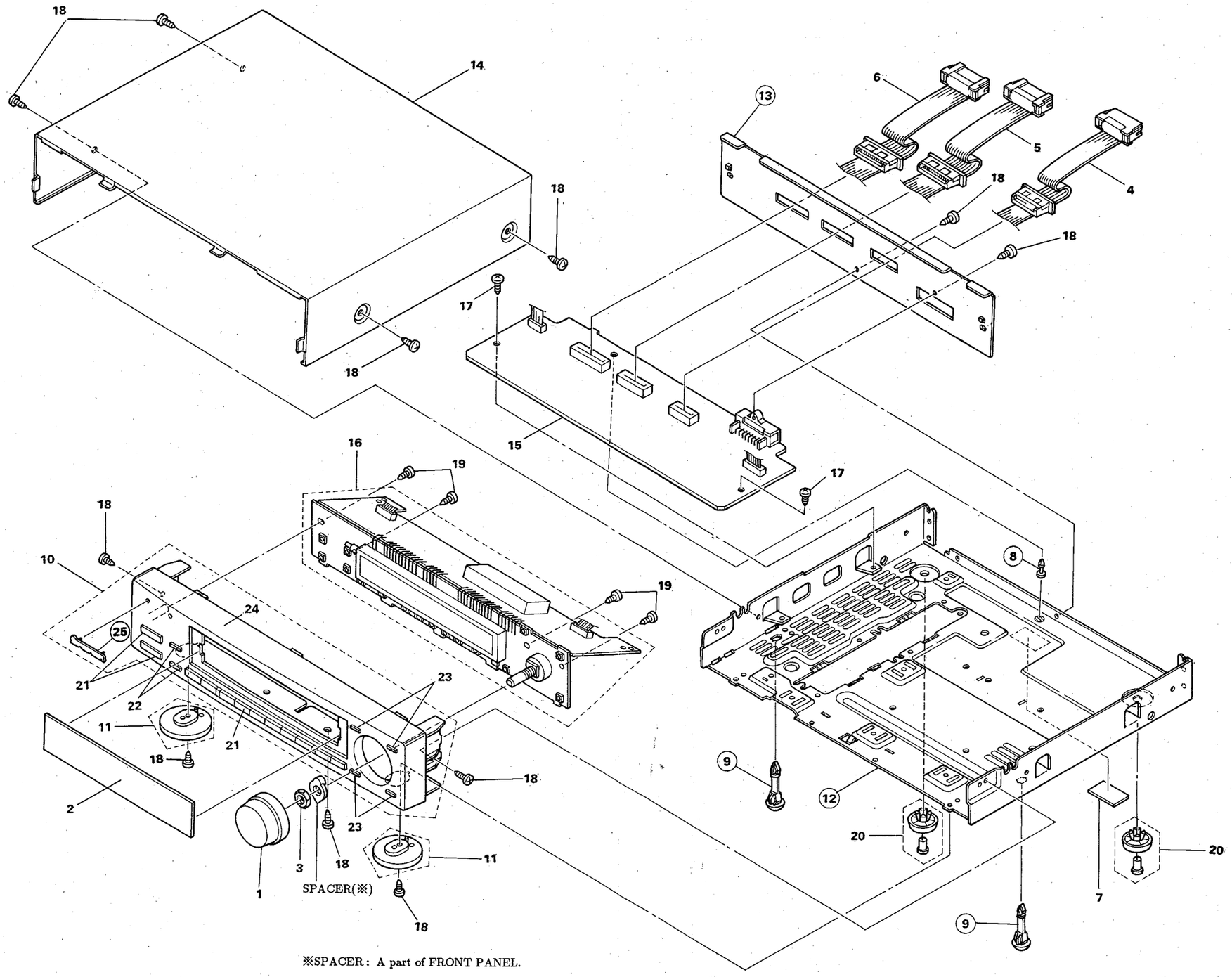


3. EXPLODED VIEWS AND PARTS LIST

NOTES :

- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

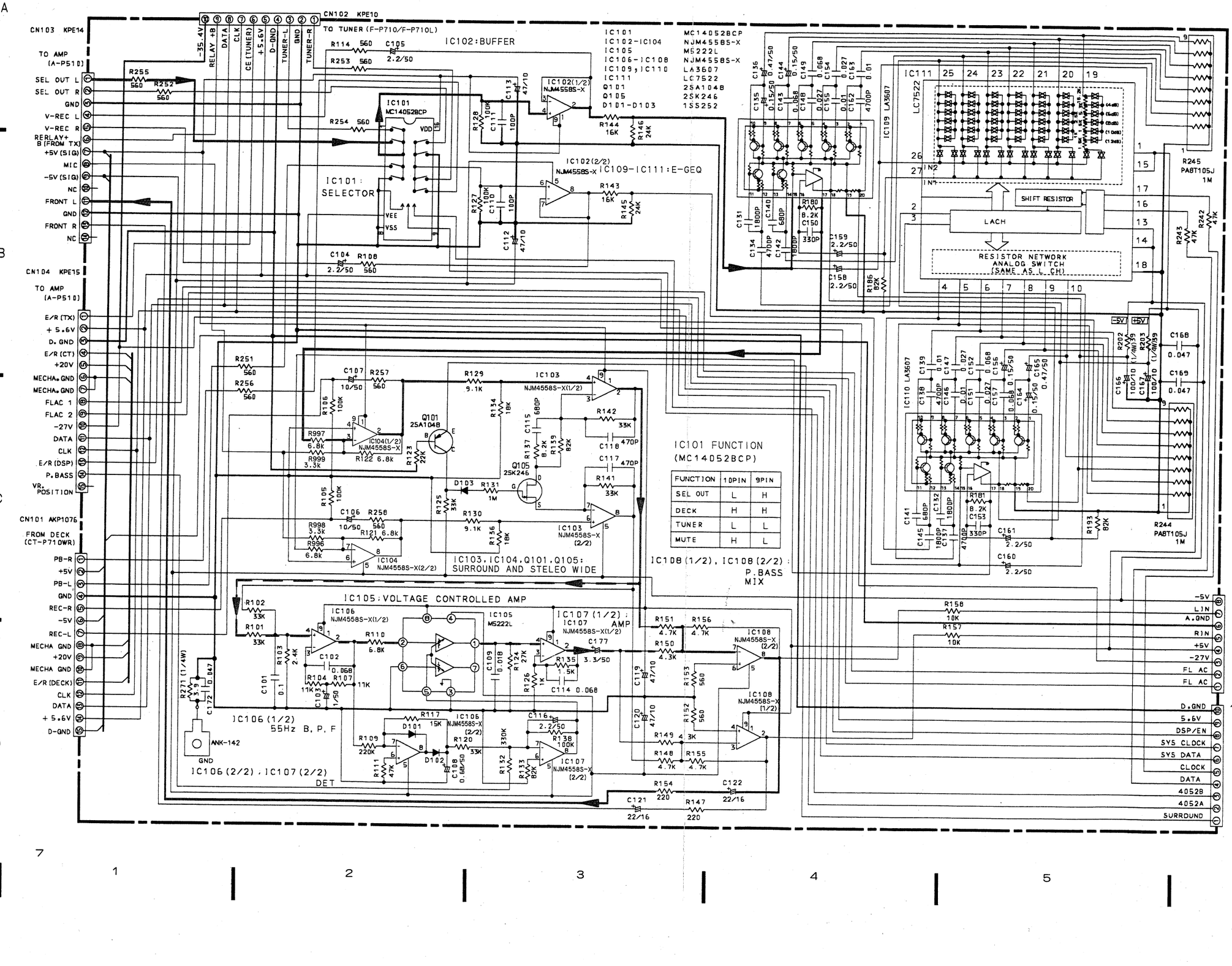
Mark	No.	Description	Part No.
	1	ROTARY KNOB	AAB1182
	2	PLATE(PVC)	AAK2009
	3	NUT	ABN1016
	4	CORD WITH PLUG(Black)	ADE1092
	5	CORD WITH PLUG(White)	ADE1094
	6	CORD WITH PLUG(Green)	ADE1096
	7	INSULATER	AEB1131
	8	SPACER	
	9	PCB SUPPORT	
	10	FRONT PANEL ASSEMBLY	AMB1711
	11	INSULATOR ASSEMBLY	AMR2148
	12	CHASSIS	
	13	REAR PANEL	
	14	BONNET(FE)	ANE1259
◉	15	GEQ ASSEMBLY	AWZ3394
◉	16	DISP.& CONTROL ASSEMBLY	AWZ3152
	17	SCREW	BBZ30P080FMC
	18	SCREW	BBZ30P080FZK
	19	SCREW	BPZ26P080FMC
	20	FOOT (RUBBER)	REC-434
	21	GEQ BUTTON	AAD1846
	22	TACT BUTTON	AAD1850
	23	IMAGE BUTTON	AAD1851
	24	FRONT PANEL	AMB1712
	25	NAME PLATE(PLASTIC)	



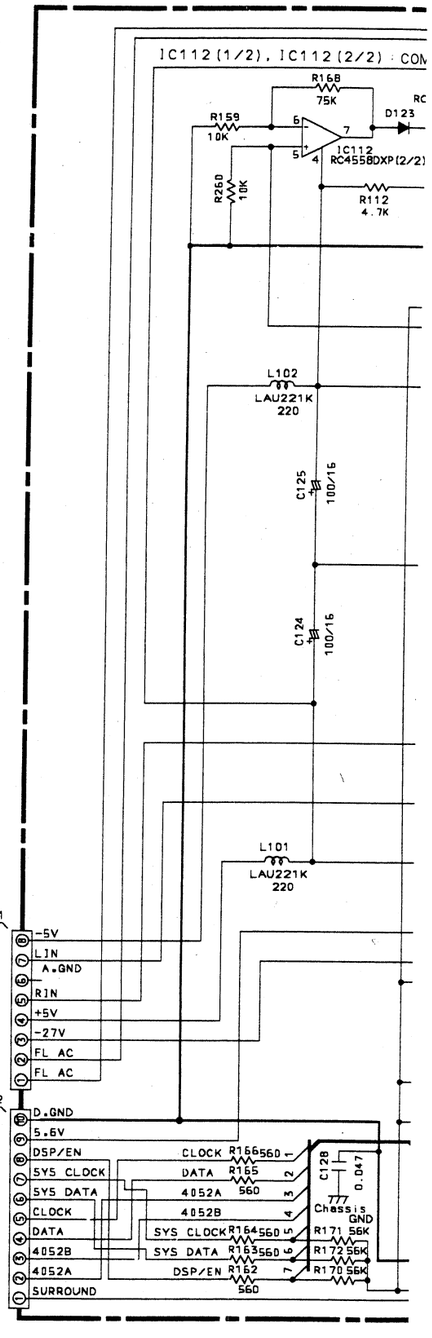
※SPACER : A part of FRONT PANEL.

4. SCHEMATIC DIAGRAMS

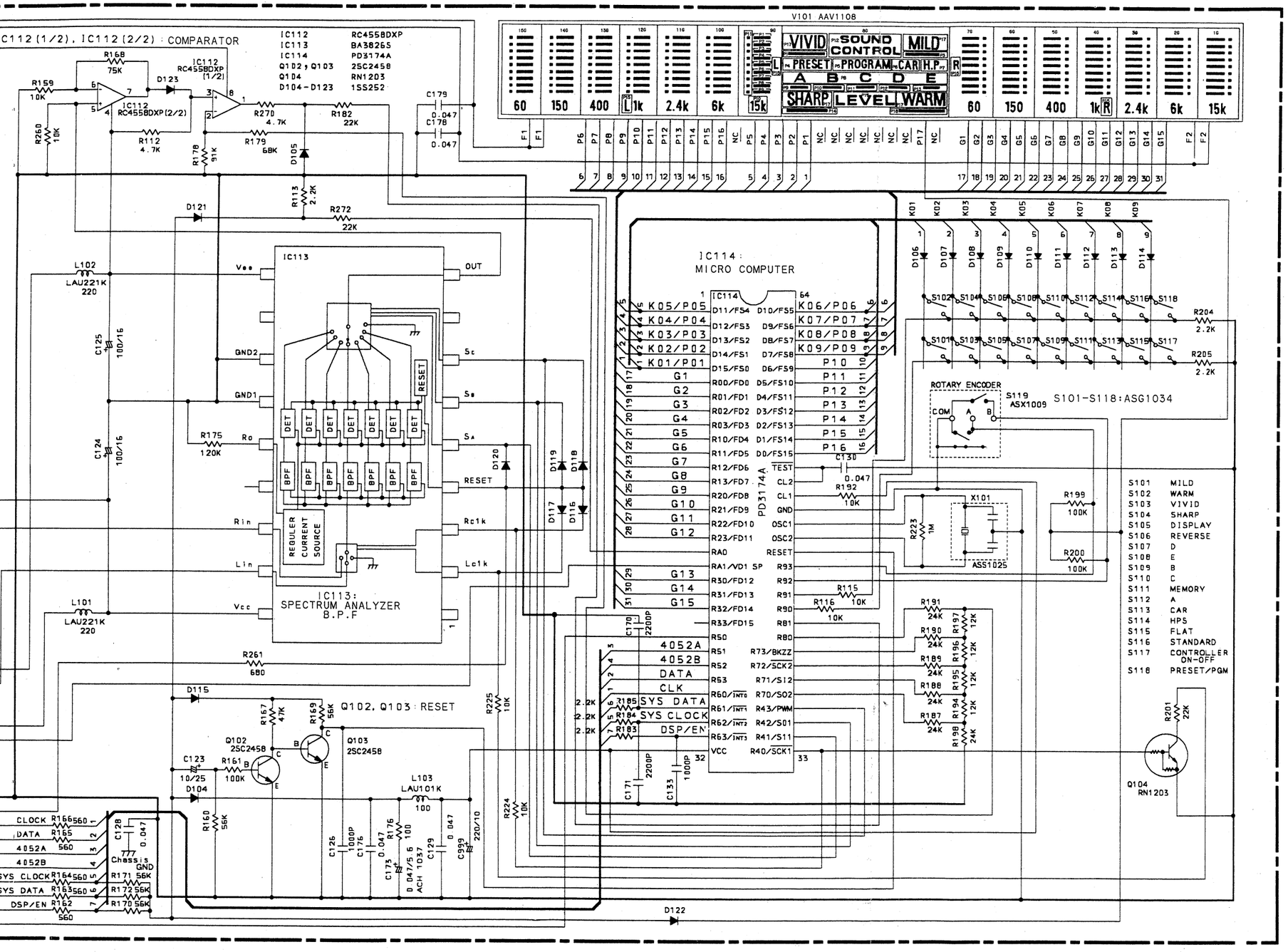
◉ GEQ ASS'Y (AWZ3394)



◉ DISP. & CONTROL ASS'Y



CONTROL ASS'Y (AWZ3152)



1.RESISTORS :
Indicated in Ω, 1/8, 1/6, 1/4W,, ±5% tolerance unless otherwise noted k ; kΩ, M ; MΩ, (F) ; ±1%, (G) ; ±2%, (K) ; ±10%, (M) ; ±20% tolerance.

2.CAPACITORS :
Indicated in capacity (μF)/voltage(V) unless otherwise noted p ; pF. Indication without voltage is 50V except electrolytic capacitor.

3.VOLTAGE, CURRENT :
; DC voltage (V) at no input signal.
Value in ( ) is DC voltage at rated power.
⇦mA ; DC current at no input signal.

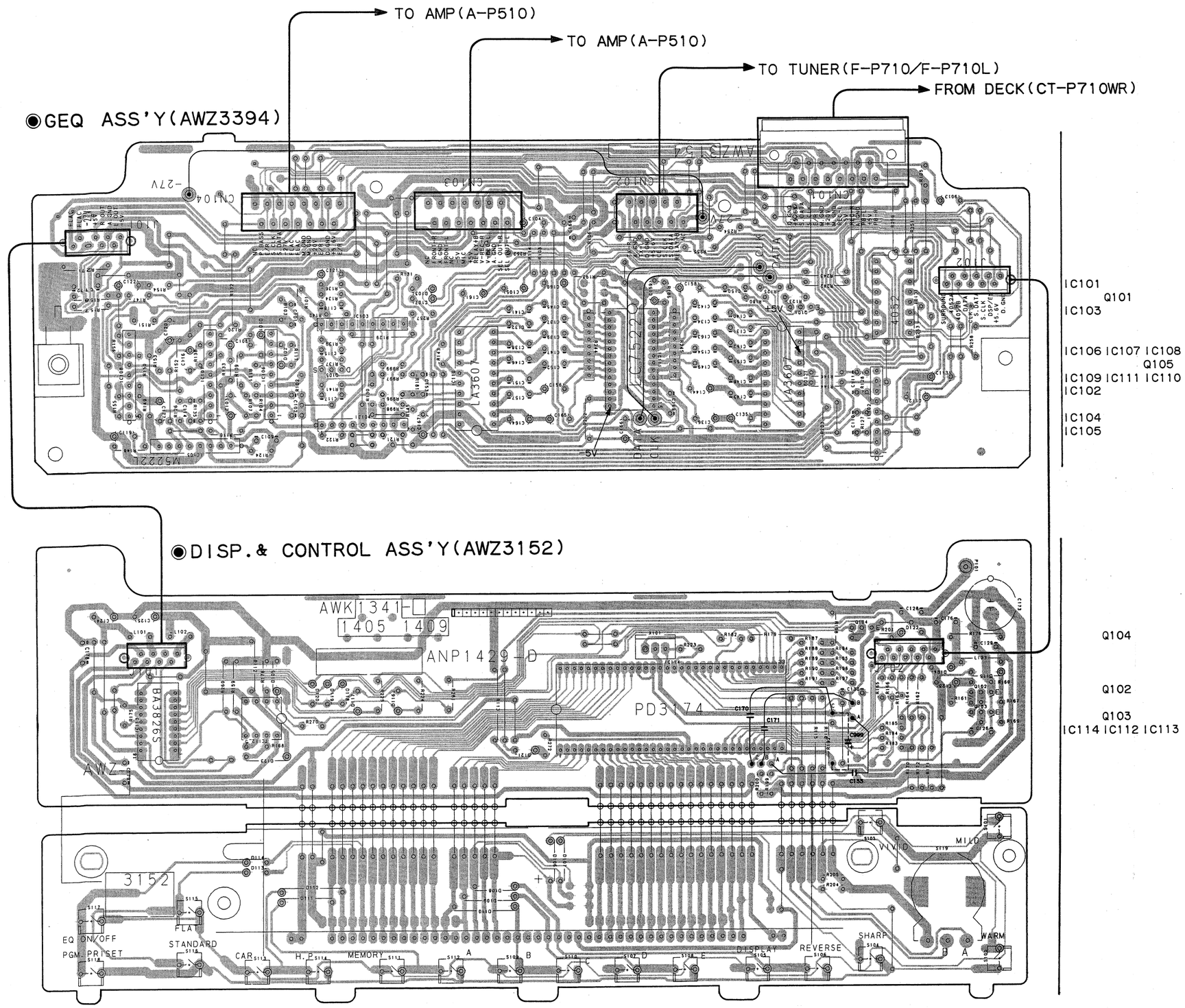
4.OTHERS :
➡ ; Signal route.
⊘ ; Adjusting point
The ⚠ mark found on some component parts indicates the inportance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5.SWITCHES : (The underline indicates the switch position.)
DISP. & CONTOROL ASSEMBLY

S101 : MILD	S111 : MEMORY
S102 : WARM	S112 : A
S103 : VIVID	S113 : CAR
S104 : SHARP	S114 : HPS
S105 : DISPLAY	S115 : FLAT
S106 : REVERSE	S116 : STANDARD
S107 : D	S117 : CONTROLLER ON-OFF
S108 : E	S118 : PRESET/PGM
S109 : B	S119 : SOUND JOG
S110 : C	

: MAIN SIGNAL
: P. BASS SIGNAL

5. PCB CONNECTION DIAGRAMS



IC101
Q101
IC103

IC106 IC107 IC108
Q105
IC109 IC111 IC110
IC102

IC104
IC105

Q104

Q102

Q103
IC114 IC112 IC113

NOTE

1. This P.C.B connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wirng symbols listed in the following Table.

P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
Q504		Transistor
Q215		Radiator type transistor
D203	D203	Diode
R237	R237	Resistor
C513		Capacitor (Polarity)
C518		Capacitor (Non-polarity)

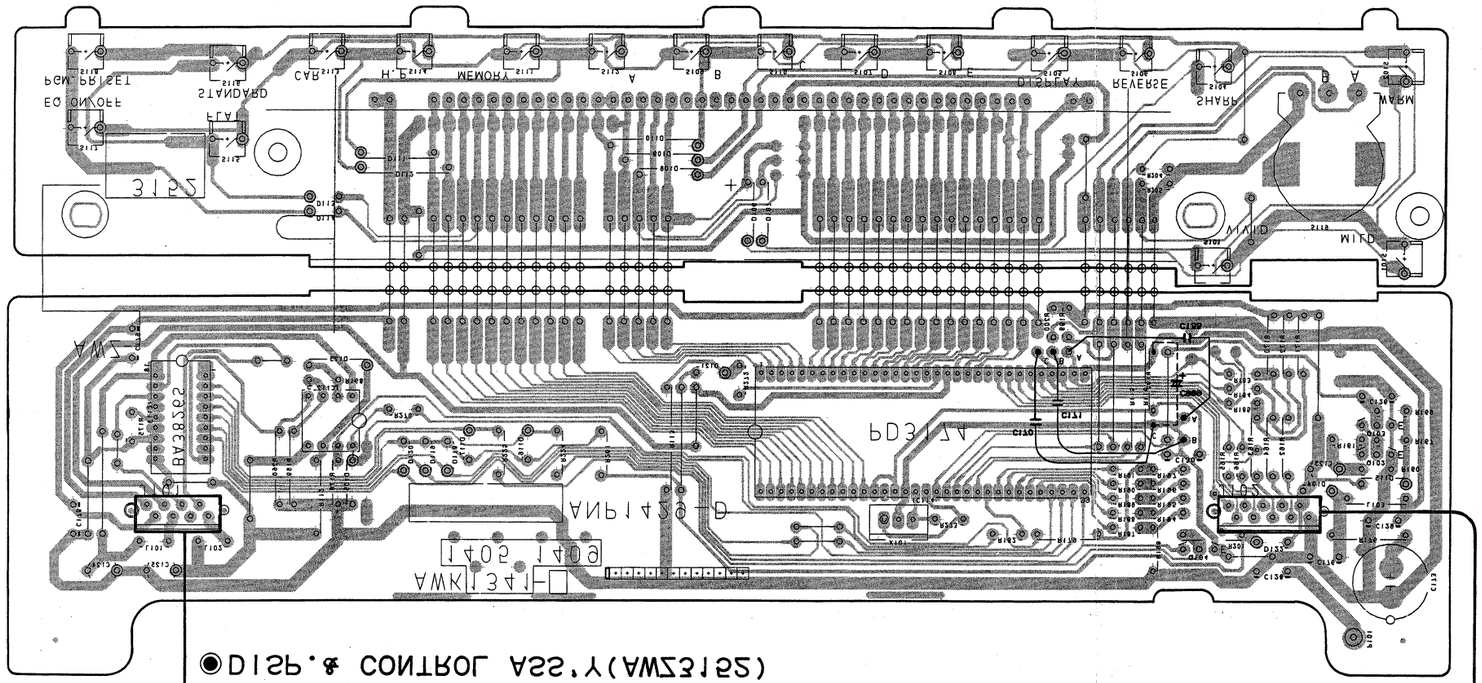
Others

P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

3. The capactor terminal marked with ◎ (double circles) shows negative terminal.
4. The diode terminal marked with ◎ (double circles) shows cathode side.
5. The transistor terminal to which E is affixed shows the emitter.

2. PCB CONNECTION DIAGRAMS

This P.C.B. connection diagram is viewed from the foil side.



6. PCB PARTS LIST

NOTES:

- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

Ex.1 *When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).*

560Ω	*56 × 10¹*	*561*	..... *RD1/4PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	..... *RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		..... *RD2H 0 R 5 K*
1Ω	*010*		..... *RD1P 0 1 0 K*

Ex.2 *When there are 3 effective digits (such as in high precision metal film resistors).*

5.62kΩ *562 × 10¹* *5621* ..... *RD1/4SR 5 6 2 1 F*

Mark	Symbol & Description	Part No.
	◉DISP. & CONTROL ASSEMBLY (AWZ3152)	
	SEMICONDUCTORS	
	IC112 OP-AMP IC	RC4558DXP
	IC113 GEQ-BPF IC	BA3826S
	IC114	PD3174A
	Q102,Q103 TRANSISTOR	2SC2458
	Q104 TRANSISTOR	RN1203
	D104-D123 DIODE	1SS252
	SWITCHES	
	S101-S118 SWITCH	ASG1034
	S119 ROTARY ENCODER	ASX1009
	COIL	
	L101,L102 AXIAL INDUCTOR	LAU221K
	L103 AXIAL INDUCTOR	LAU101K
	CAPACITORS	
	C123 ELECTR.CAPACITOR	CEAS100M25
	C124,C125 ELECTR.CAPACITOR	CEAS101M16
	C126 CERAMIC CAPACITOR	CKCYB102K50
	C128-C130 CERAMIC CAPACITOR	CKCYF473Z50
	C133 CERAMIC CAPACITOR	CKDYB102K50
	C170,C171 CERAMIC CAPACITOR	CKDYB222K50
	C172 CERAMIC CAPACITOR	CKCYF473Z50
	C173 CEA (47000/5.5V)	ACH1037
	C176-C179 CERAMIC CAPACITOR	CKCYF473Z50
	C999 ELECTROLYTIC CAPACIT	CEAS221M10
	RESISTORS	
	All resistors	RD1/8PM□□□J
	OTHERS	
	V101 FL TUBE	AAV1108
	X101 CERAMIC RESONATOR	ASS1025

Mark	Symbol & Description	Part No.
	◉GEQ ASSEMBLY (AWZ3394)	
	SEMICONDUCTORS	
	IC101	MC14052BCP
	IC102-IC104 OP-AMP IC	NJM4558S-X
	IC105 E-VR IC	M5222L
	IC106-IC108 OP-AMP IC	NJM4558S-X
	IC109,IC110 GEQ IC	LA3607
	IC111 GEQ EVR IC	LC7522
	Q101 TRANSISTOR	2SA1048
	Q105 N-FET	2SK246
	D101-D103 DIODE	1SS252
	CAPACITORS	
	C101 CERAMIC CAPACITOR	CKCYX104M25
	C102 CERAMIC CAPACITOR	CKDYX683M25
	C103 ELECTR.CAPACITOR	CEAS010M50
	C104,C105 ELECTR.CAPACITOR	CEAS2R2M50
	C106,C107 ELECTR.CAPACITOR	CEAS100M50
	C108 ELECTR.CAPACITOR	CEASR68M50
	C109 CERAMIC CAPACITOR	CKDYX183M25
	C110,C111 CERAMIC CAPACITOR	CCCSL101J50
	C112,C112 ELECTR.CAPACITOR	CEAS470M10
	C114 CERAMIC CAPACITOR	CKDYX683M25
	C115 CERAMIC CAPACITOR	CKMYB681K50
	C116 ELECTR.CAPACITOR	CEAS2R2M50
	C117,C118 CERAMIC CAPACITOR	CKCYB471K50
	C119,C120 ELECTR.CAPACITOR	CEAS470M10
	C121,C122 ELECTR.CAPACITOR	CEAS220M16
	C131,C132 CERAMIC CAPACITOR	CGMYB182M50
	C134 CERAMIC CAPACITOR	CGMYX472M25
	C135 ELECTROLYTIC CAPACIT	CEASR15M50
	C136 ELECTR.CAPACITOR	CEASR47M50
	C137,C138 CERAMIC CAPACITOR	CGMYX472M25
	C139 CERAMIC CAPACITOR	CGMYX103M16
	C140,C141 CERAMIC CAPACITOR	CKMYB681K50
	C142 CERAMIC CAPACITOR	CGMYB182M50
	C143 CERAMIC CAPACITOR	CKCYX683M25
	C144 ELECTROLYTIC CAPACIT	CEASR15M50

Mark	Symbol & Description	Part No.
	C145 CERAMIC CAPACITOR	CGMYB182M50
	C146 CERAMIC CAPACITOR	CGMYX103M16
	C147,C148 CERAMIC CAPACITOR	CKCYX273M25
	C149 CERAMIC CAPACITOR	CKCYX683M25
	C150 CERAMIC CAPACITOR	CKCYB331K50
	C151 CERAMIC CAPACITOR	CKCYX273M25
	C152 CERAMIC CAPACITOR	CKCYX683M25
	C153 CERAMIC CAPACITOR	CKCYB331K50
	C154 CERAMIC CAPACITOR	CKCYX273M25
	C155 CERAMIC CAPACITOR	CGMYX103M16
	C156 ELECTROLYTIC CAPACIT	CEASR15M50
	C157 CERAMIC CAPACITOR	CKCYX683M25
	C158-C161 ELECTR.CAPACITOR	CEAS2R2M50
	C162 CERAMIC CAPACITOR	CGMYX472M25
	C163 CERAMIC CAPACITOR	CGMYX103M16
	C164 ELECTROLYTIC CAPACIT	CEASR15M50
	C165 ELECTR.CAPACITOR	CEASR47M50
	C166,C167 ELECTR.CAPACITOR	CEAS101M10
	C168,C169 CERAMIC CAPACITOR	CKCYF473Z50
	C177 ELECTR.CAPACITOR	CEAS3R3M50
RESISTORS		
	R202,R203 CARBON FILM RESISTOR	RD1/4PM390J
	R244 RESISTOR ARRAY (1M)	RA8T105J
	R245 RESISTOR ARRAY (1M)	RA8T105J
	R271 CARBON FILM RESISTOR	RD1/4PM3R9J
	Other resistors	RD1/8PM□□□J
OTHERS		
	CN101 SOCKET(15P)	AKP1076
	CN102 CONNECTOR(10P)	KPE10
	CN103 CONNECTOR(14P)	KPE14
	CN104 CONNECTOR(15P)	KPE15

7. IC INFORMATION

• PD3174A

• Pin Function

No.	Pin name	I/O	Description
1	D11/FS 4	DP	FL SEGMENT Output (P05) KEY SCAN Output (K05)
2	D12/FS 3	DP	FL SEGMENT Output (P04) KEY SCAN Output (K04)
3	D13/FS 2	DP	FL SEGMENT Output (P03) KEY SCAN Output (K03)
4	D14/FS 1	DP	FL SEGMENT Output (P02) KEY SCAN Output (K02)
5	D15/FS 0	DP	FL SEGMENT Output (P01) KEY SCAN Output (K01)
6	R00/FD 0	DP	FL DIGIT Output (1G)
7	R01/FD 1	DP	FL DIGIT Output (2G)
8	R02/FD 2	DP	FL DIGIT Output (3G)
9	R03/FD 3	DP	FL DIGIT Output (4G)
10	R10/FD 4	DP	FL DIGIT Output (5G)
11	R11/FD 5	DP	FL DIGIT Output (6G)
12	R12/FD 6	DP	FL DIGIT Output (7G)
13	R13/FD 7	DP	FL DIGIT Output (8G)
14	R20/FD 8	DP	FL DIGIT Output (9G)
15	R21/FD 9	DP	FL DIGIT Output (10G)
16	R22/FD10	DP	FL DIGIT Output (11G)
17	R23/FD11	DP	FL DIGIT Output (12G)
18	RA 0	I	When AC power supply ceases, the backup mode is activated.
19	RA1/VDISP	I	Vfdp (−27V)
20	R30/FD12	DP	FL DIGIT Output (13G)
21	R31/FD13	DP	FL DIGIT Output (14G)
22	R32/FD14	DP	FL DIGIT Output (15G)

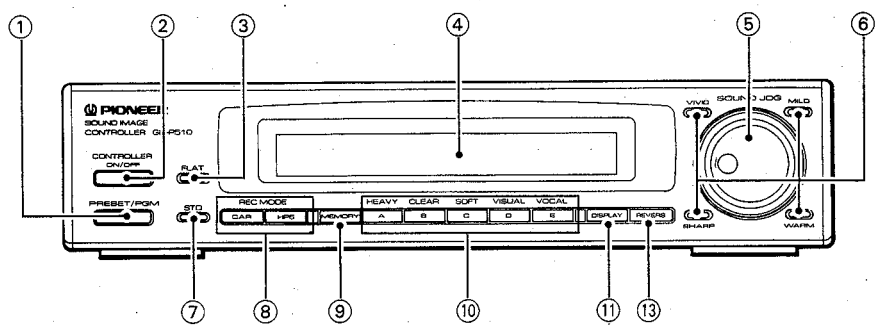
No.	Pin name	I/O	Description
23	R33/FD15	DP	Not used
24	R50	O	Not used
25	R51	O	Not used
26	R52	O	Not used
27	R53	O	LC7522 DATA Output
28	R60/$\overline{\text{INT0}}$	O	LC7522 CLOCK Output
29	R61/$\overline{\text{INT1}}$	I	SYSTEM BUS DATA Input
		O	SYSTEM BUS DATA Output
30	R62/$\overline{\text{INT2}}$	I	SYSTEM BUS CLOCK Input
31	R63/$\overline{\text{INT3}}$	I	SYSTEM BUS TALKER ENABLE Input
		O	TAKER REQUEST Output
32	Vcc	—	Connected to Power supply (+5V)
33	R40/$\overline{\text{SCK1}}$	O	BA3826 L/R Switching Output
34	R41/SI1	O	BA3826 A Output
35	R42/SO1	O	BA3826 B Output
36	R43/PWM	O	BA3826 C Output
37	R70/SO2	O	A/D converter Output
38	R71/SI2	O	A/D converter Output
39	R71/$\overline{\text{SCK2}}$	O	A/D converter Output
40	R73/BUZZ	O	A/D converter Output
41	R80	O	A/D converter Output
42	R81	I	A/D converter Input
43	R90	I	KEY SCAN Input
44	R91	I	KEY SCAN Input
45	R92	I	Rotary pulse encoder B Input
46	R93	I	Rotary pulse encoder A Input

No.	Pin name	I/O	Description
47	RESET	I/O	RESET Input
48	OSC2	O	Connected to ceramic oscillator (4.19MHz).
49	OSC1	I	Not used
50	GND	—	GND
51	CL1	I	Not used (+5V)
52	CL2	O	Not used (OPEN)
53	$\overline{\text{TEST}}$	I	Not used (+5V)
54	D0/FS16	DP	FL SEGMENT Output (P16)
55	D1/FS15	DP	FL SEGMENT Output (P15)
56	D2/FS14	DP	FL SEGMENT Output (P14)
57	D3/FS13	DP	FL SEGMENT Output (P13)
58	D4/FS12	DP	FL SEGMENT Output (P12)
59	D5/FS11	DP	FL SEGMENT Output (P11)
60	D6/FS10	DP	FL SEGMENT Output (P10) KEY SCAN Output
61	D7/FS 9	DP	FL SEGMENT Output (P 9) KEY SCAN Output(K09)
62	D8/FS 8	DP	FL SEGMENT Output (P 8) KEY SCAN Output(K08)
63	D9/FS 7	DP	FL SEGMENT Output (P 7) KEY SCAN Output(K07)
64	D10/FS 6	DP	FL SEGMENT Output (P 6) KEY SCAN Output(K06)

I : CMOS input
O : CMOS output
N : N ch open drain output
P : P ch open drain output
UN : N ch open drain output with pull-up resistor
DP : P ch open drain output with pull-down resistor
UI : CMOS input with pull-up resistor
DI : CMOS input with pull-down resistor

8. PANEL FACILITIES

FRONT PANEL FACILITIES



① PRESET/PGM button
This button allows you to select whether your own individually created equalizer curves, or factory-preset curves are recalled by the sound image selector buttons.

② CONTROLLER ON/OFF button
Use to set sound effect characteristics.

③ FLAT button
Use this to make all equalization patterns flat.

④ Display section

⑤ SOUND JOG
Use to change the sound effect characteristics level.

⑥ Image effect buttons (VIVID, MILD, SHARP, WARM)
Use these buttons to recall previous effect mode settings. After recalling the desired effect mode, the effect level can be adjusted by using SOUND JOG.

⑦ STD (standard) button
After modifying sound effects with the SOUND JOG control, press this button to return the effects to their standard response settings.

⑧ REC MODE selector buttons (CAR, HPS)
Press to set recording frequency response to optimum levels for car stereo (CAR) or headphone stereo (HPS).

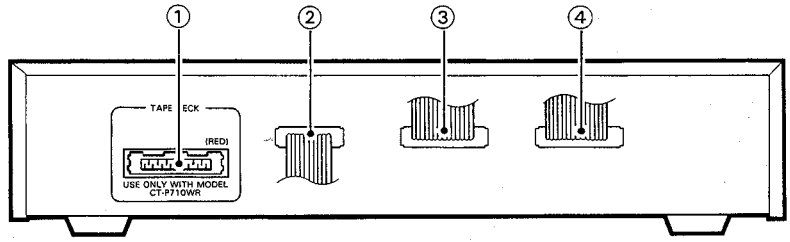
⑨ MEMORY button
Used for storing sound field (image) you input with the sound field (image) selector buttons.

⑩ Sound image selector buttons (HEAVY, CLEAR, SOFT, VISUAL, VOCAL)
Use these buttons to recall one of the preset sound image modes.

⑪ DISPLAY button
Use to switch the display mode in the display section. Spectrum analyzer, graphic equalizer, and listening point selector display are possible.

⑬ REVERSE button
Pressing this button inverts the frequency response patterns selected with the image effect buttons and sound image selector buttons.

REAR PANEL FACILITIES



① **TAPE DECK jack (red)**
Connect the CASSETTE DECK system cable (red) here.

② **SOUND FIELD PROCESSOR (or SOUND IMAGE CONTROLLER) system cable (black)**
Connect to the SOUND PROCESSOR/SOUND CONTROLLER jack (black) of the tuner.

③ **SOUND FIELD PROCESSOR (or SOUND IMAGE CONTROLLER) system cable (white)**
Connect to the SOUND PROCESSOR jack (white)of the amplifier.

④ **SOUND FIELD PROCESSOR (or SOUND IMAGE CONTROLLER) system cable (green)**
Connect to the SOUND PROCESSOR jack (green) of the amplifier.

9. SPECIFICATIONS

Central frequencies ..... 60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz, 15 kHz
Maximum range of variation ..... ±8 dB

Spectrum Analyzer Section
Central frequencies ..... 60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz, 15 kHz
External dimensions .....
260 (W) × 58.5 (H) × 243.5 (D) mm
10-3/16 (W) × 2-1/4 (H) × 9-9/16 (D) in
Weight ..... 1.5 kg (3 lb 5 oz.)